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10/528,174	03/17/2005	Manabu Inoue	8861-520US (P35017-01)	6507

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EXAMINER	
AMRANY, ADI	
ART UNIT	**PAPER NUMBER**
2836	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/04/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/528,174	INOUE ET AL.	
	Examiner	Art Unit	
	Adi Amrany	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 December 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8 and 10-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8 and 10-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/19/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicants' arguments filed December 5, 2006 have been fully considered but they are not persuasive. Applicants' arguments are equivalent to stating that the Ikeda bypass switch turns off before the converter turns on, which means that the Ikeda system is a break-before-make power supply. This configuration would cut off power to the load. Ikeda, however, states that the purpose of the power unit is to supply continuous power (column 2, lines 18-22, 65-68; column 4, lines 42-44). The non-final rejection (September 6, 2006) further stated the interpretation that the bypass control section acts as a time delay. Support for this interpretation is that the Ikeda bypass switch function is timed relative to the converter to provide *continuous* power, and is therefor on for a *predetermined period of time* after the start of said switching operation.

Specification

2. Applicants' changes to the specification, in order to shorten the Summary of the Invention, are noted. The specification, however, remains over 146 pages long, and has not been checked to the extent necessary to determine the presence of all possible minor errors (especially the section changed by the applicants). Applicants' cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-8 and 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda (US 5,161,097).

With respect to claim 1, Ikeda discloses a direct-current power supply (figure 1) comprising:

a DC-DC converter (figure 1, item 2; column 3, lines 16-21), by its switching operation, converting an input voltage applied from an external direct-current power supply into an output voltage equal to or higher than the input voltage, and applying the output voltage to an external load;

a converter control section (figure 1, item 2; column 3, line 42 to column 4, line 12) comparing said output voltage with a desired voltage, and based on their difference, controlling said switching operation of said DC-DC converter;

a bypass switch (figure 1, item 4; column 3, lines 21-27) shorting between the input and output of said DC-DC converter; and

a bypass control section (figure 1, items 5, 6; column 4, lines 13-24) maintaining said bypass switch in the ON state during non-operation of said DC-DC converter, and at a start of said switching operation of said DC-DC converter, further maintaining said bypass switch in the ON state for a predetermined time

after the start of said switching operation (column 2, lines 18-22, 65-68; column 4, lines 42-44).

One skilled in the art would recognize that the bypass control circuit comprises a delay to switch off the latching relay (4) only after the DC/DC converter (2) has turned on, in order to maintain continuous power to the load.

With respect to claim 2, Ikeda does not expressly disclose said bypass control section compares said input voltage with *said output voltage*, and turns on and off said bypass switch when said input voltage is higher and lower than *said output voltage*, respectively.

Ikeda discloses that the bypass control section compares the input voltage with a reference voltage (figure 1, item "Vb"), and turns on and off said bypass switch when said input voltage is higher and lower than the reference voltage (column 3, lines 27-41, "Vs"). The voltage source Vb in figure 1 is the same as the reference voltage Vs in figure 2 (column 4, lines 1-2). It would have been obvious to a person of ordinary skill in the art to replace the Ikeda reference voltage (Vb/Vs) with the output voltage (Vo), as used in the present application, because when the bypass switch is ON, the output voltage is equal to the input voltage. In the present application, the converter is turned on when the output voltage reaches a reference value (ET; figure 3a).

With respect to claim 3, Ikeda further discloses:

said direct-current power supply comprises a start control section (figure 1, items 5, 26; column 3, lines 54-57; column 4, lines 8-12) sending a predetermined start signal to said converter control section based on one or both

of said input and output voltage (column 4, lines 3-8); said converter control section in non-operation starts upon receipt of said start signal (column 4, lines 8-12); and

said bypass control section includes:

a signal delay section (figure 1, item 5; column 4, lines 13-15) holding said start signal for a predetermined delay time from the instant of receipt; and

a switch driving section (figure 1, item 6; column 4, lines 15-19) maintaining said bypass switch in the ON state until the receipt of said start signal from said signal delay section (column 3, lines 26-27), and turning off said bypass switch at the receipt of said start signal.

Ikeda discloses the signal delay section, as discussed above.

With respect to claim 4, Ikeda further discloses:

said start control section sends a predetermined stop signal to said converter control section, based on said input voltage (column 4, lines 8-12);

said converter control section in operation stops upon receipt of said stop signal (column 4, lines 8-12); and

in said bypass control section:

said signal delay section holds said stop signal for a predetermined delay time from the instant of receipt (figure 1, item 5; column 4, lines 13-15); and

said switch driving section maintains said bypass switch in the OFF state until the receipt of said stop signal from said signal delay section (column 3, lines 26-27), and turning on said bypass switch at the receipt of said stop signal (column 4, lines 15-19).

With respect to claim 5, Ikeda further discloses:

said direct-current power supply comprises an input voltage detecting section (figure 1, items R3, R4; column 3, line 67 to column 4, line 3) comparing said input voltage with a start input voltage;

said converter control section, based on the output of said input voltage detection section:

maintains said DC –DC converter in non-operation during the period when said input voltage is higher than said start input voltage (column 4, lines 3-5 and 9-12); and

causes said DC-DC converter to start said switching operation at the detection of the fall of said input voltage to said start input voltage (column 4, lines 5-7).

With respect to claim 6, Ikeda further discloses:

an input voltage detecting section (figure 1, items R3, R4; column 3, line 67 to column 4, line 3) comparing said input voltage with a stop input voltage (Vb);

an output voltage detecting section (figure 1, items R1, R2; column 3, lines 54-57) comparing said output voltage with a start output voltage (Va); and

a start control section (figure 1, items 5 and 26; column 3, lines 54-57; column 4, lines 8-12):

based on the output of said output voltage detecting section, maintaining said converter control section in non-operation during the period when said output voltage is higher than said start output voltage, and causing said converter control section to start at the detection of the fall of said output voltage to said start output voltage (column 3, lines 57-66).

based on the output of said input voltage detecting section, maintaining said converter control section in operation during the period when said input voltage is lower than said stop input voltage, and causing said converter control section to stop at the detection of the rise of said input voltage to said stop input voltage (column 4, lines 3-12).

With respect to claim 7, Ikeda further discloses said start control section, based on the outputs of said input voltage detecting section and said output voltage detecting section:

maintains said converter control section in non-operation during the period when said input voltage is higher than said stop input voltage (column 4, lines 3-12) and output voltage is higher than said start output voltage; and

causes said converter control section to start when said input voltage falls below said stop input voltage (column 4, lines 3-12) and the fall of said output voltage to said start output voltage is detected (column 3, liens 57-66).

With respect to claim 8, Ikeda further discloses:

said DC-DC converter has the ability of buck operation (column 4, lines 25-31) converting said input voltage into said output voltage equal to or lower than the input voltage, in addition to the ability of boost operation converting said input voltage into said output voltage equal to or higher than the input voltage;

said converter control section, based on the difference between said output voltage and said desired voltage, causes said DC-DC converter to perform one of said buck operation and boost operation or to be maintained in non-operation; and

at the start of the boost operation of said DC-DC converter, said bypass control said further maintains said bypass switch in the ON state for a predetermined time from the instant of the start (column 4, lines 13-24).

The delay of the bypass control is discussed above in the rejection of claim 1. Ikeda discloses that the converter is initially configured in buck operation while the voltage of the battery is excessively high. After the output of the battery has dropped to an appropriate level, the converter is configured in boost operation.

With respect to claim 11, Ikeda does not expressly disclose a stop switch. It would have been obvious to a person of ordinary skill that the Ikeda power supply comprises a stop switch operated under an on-off control of said external load and cutting off one of an input current provided from said external direct-current power supply and an output current provided for said external load. Ikeda discloses that the power supply is for use with a cordless electronic appliance (column 1, lines 15-22). It

would be obvious to one skilled in the art that these cordless electronic appliances comprise a stop switch operated under an on-off control of said external load (the appliance) to disconnect the battery from the load. The motivation for doing so would have been to allow the user to turn the appliance off, and therefor, preserve battery power during periods of non-use.

With respect to claims 12-13, Ikeda discloses the direct-current power supply according to claim 11, and further, it would have been obvious to a person of ordinary skill to provide the stop switch at the back end (claim 12; "a node near said external load between said DC-DC converter and said bypass switch") or the front end (claim 13; "a node near said external direct-current power supply between said DC-DC converter and said bypass switch") of the power supply, in order to disconnect the battery from the load. Disconnecting the current path at the back end (adjacent the smoothing capacitor and load) or the front end (adjacent the battery) are art recognized equivalents because both will have the same effect of discontinuing power supply from the battery to the load.

With respect to claim 14, Ikeda discloses a battery-powered electronic apparatus (figure 1) comprising:

a battery supplying a predetermined battery voltage (figure 1, item 1; column 3, lines 16-21); and

a direct-current power supply (figure 1) comprising:

a DC-DC converter (figure 1, item 2; column 3, lines 16-21), by its switching operation ("chopper controlled"), converting said battery voltage into an output voltage equal to or higher than the battery voltage ("booster type");

a converter control section (figure 1, item 2; column 3, line 42 to column 4, line 12) comparing said output voltage with a desired voltage, and based on their difference, controlling said switching operation of said DC-DC converter;

a bypass switch (figure 1, item 4; column 3, lines 21-27) shorting between the input and output of said DC-DC converter; and

a bypass control section (figure 1, items 5, 6; column 4, lines 13-24) maintaining said bypass switch in the ON state during non-operation of said DC-DC converter, and at a start of said switching operation of said DC-DC converter, further maintaining said bypass switch in the ON state for a predetermined time after the start of said switching operation (column 2, lines 18-22, 65-68; column 4, lines 42-44).

With respect to claim 15, Ikeda further discloses said battery voltage falls below said desired voltage in the middle of discharge of said battery (column 2, lines 2-4; column 4, lines 32-44).

5. Claims 10 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda in view of Vinciarelli (US 6,975,098).

Ikeda discloses the direct-current power supply according to claims 1 and 8 and a rectifying diode (figure 1, item 23), but does not expressly disclose a synchronous rectifier section performing rectification during operation of said DC-DC converter in

synchronization with its switching operation, and maintaining the ON state during non-operation of said DC-DC converter.

Vinciarelli discloses a switching DC-DC converter comprising a synchronous rectifier (column 21, line 65 to column 22, line 22).

Ikeda and Vinciarelli are analogous because they are from the same field of endeavor, namely switching DC-DC converters. At the time of the invention by applicants, it would have been obvious to a person of ordinary skill in the art to combine the direct-current power supply disclosed in Ikeda with the synchronous rectifier disclosed in Vinciarelli. The motivation for doing so would have been to reduce switching losses.

6. Claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda in view of Rose (US 5,297,203).

With respect to claim 16, Ikeda discloses the battery-powered electronic apparatus according to claim 14. Ikeda discloses that the apparatus comprises a cordless electronic appliance (column 1, lines 15-19), but does not expressly disclose the apparatus comprises a wireless transmitter section sending a signal by radio waves to the outside.

Rose discloses a cordless electronic appliance (figure 1; column 16, lines 11-13) operating on battery power (column 16, lines 24-27), further comprising a wireless transmitter (figure 1, item 101; column 16, liens 13-18) section sending a signal by radio waves to the outside.

Ikeda and Rose are analogous because they are from the same field of endeavor, namely battery-powered wireless electronic appliances. At the time of the invention by applicants, it would have been obvious to a person of ordinary skill in the art to combine the battery-powered electronic apparatus and direct-current power supply disclosed in Ikeda with the wireless battery-powered electronic appliance disclosed in Rose. The motivation for doing so would have been to utilize the direct-current power supply to extend the batter life of the wireless appliance.

With respect to claim 17, Rose further discloses said wireless transmitter section includes a power amplifier section (figure 2, item 130; column 17, lines 15-22) amplifying a signal to be sent under the application of said output voltage of said DC-DC converter. Further, it is inherent that the signal is sent under the application of the output of the converter because the wireless appliance only contains one power source, the battery and converter, as disclosed in Ikeda.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adi Amrany whose telephone number is (571) 272-0415. The examiner can normally be reached on weekdays, from 9am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (571) 272-2800 x36. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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